

REMARKS

The present is in response to the Office Action of January 26, 2007. Filed with this response is the required Petition for a one month extension of time. In view of the remarks which follow, favorable reconsideration of the subject application is respectfully requested.

Claims 1-31 and 48-79 are all the claims active in the application.

The examiner has rejected claims 1-3, 11-15, 45-51, and 59-63 as being anticipated by Palese et al. (2002/0131164). Specifically, the examiner states that Palese et al. describe an apparatus "...generating optical pulses, wherein each pulse may have individualized characteristics..." Applicants respectfully disagree. While Palese describes an apparatus which generates many independent laser beams to be manipulated and recombined, the apparatus was not intended to, and in fact cannot, create/manipulate a train of individualized composite pulses as claimed.

The invention provides the ability to dynamically tailor the properties of a train of pulses such that each pulse may have individualized characteristics. This ability enables, for example, particular advantages with respect to target manipulation in order to achieve specific results in materials processing. No such ability is found in Palese.

The Examiner will note from Figure 4 of Palese that the disclosed system includes phase modulators with feedback loops. The purpose of this control is not to tailor the individual pulse characteristics, but rather to maintain coherence among the individual beam lines. Further, there is neither the disclosure nor the intent in Palese to vary the laser repetition rate or to link this parameter to materials processing. Furthermore, while Palese includes methods for monitoring

and manipulating laser power, spectrum and phase in individual beam lines, the purpose is again to enable coherent combination of an array of fiber lasers.

This application and the associated monitors, controls and feedback systems according to the invention are fundamentally distinct from those described in Palese, and as such Palese is insufficient to teach or educate one skilled in the art to create the integrated laser materials processing system described in the invention.

The examiner rejects claims 4-6, 8, 10, 16-22, 24, 26-31, 52-54, 58, 64-70, 72, and 74-79 as being unpatentable over Palese in view of Kane (6,219,142).

Specifically, the examiner rejects claims 4, 16-20, 27-31, 52, 64-68, and 75-79 based on the assertion that Palese anticipates all limitations of the claims except for pulsewidth monitoring as described by Kane. While Kane describes a technique for measuring pulse shape via optical gating, there is no description for how this could be used to provide feedback to a laser system for dynamic pulse shape control. Furthermore, neither Palese nor Kane, individually or in combination, suggest means by which the pulse shape could be dynamically adjusted in a laser system. Finally, neither Palese nor Kane, individually or in combination, suggest the value of such dynamic pulse width manipulation for materials processing.

The examiner rejects claims 5-6, 21-22, 53-54, and 69-70, citing Kane's disclosure of optical frequency conversion to higher order harmonics. The examiner rejects claims 8, 24, 56, and 72, because Kane discloses a spectrometer. The examiner rejects claims 10, 26, 58, and 74 citing Kane's beam profiler. While it is true that Kane discloses higher order optical frequency conversion, a spectrometer, and a beam profiler as being components for "measuring and

determining the characteristics of wave phenomenon” (col. 10, l. 67 – col. 11, l. 1), these are not linked to any means for dynamic control/manipulation of a laser. The invention, in contrast, uniquely educates the reader how to link monitor systems with manipulation means so as to enable dynamic control of laser/material interaction parameters, and explicitly describes the methods to dynamically manipulate laser parameters in conjunction with target manipulation and explains how this can be used to significantly improve laser materials processing results. As noted, this is beyond the scope of Palese and Kane.

Finally, the examiner rejects claims 9, 25, 57, and 73 as being unpatentable over Palese in view of Kane and further in view of DeSimone (5,933,274). While the examiner is correct that a method for accurate alignment to a cross hair and adjustment of the ablation plane is described in DeSimone; the invention includes additional methods which allow for independent control of beam size and divergence along x and y axes. Specifically, the figures 11a and 11b embody a novel method for controlling the beam size and shape in a way not anticipated by Palese, Kane, DeSimone, or any combination thereof. Furthermore, the novelty of the invention here is not simply the manipulation of the beam relative to the target (such as through the use of scanning optics and telescopes), but rather the linking of this manipulation with other beam and target parameters in order to dynamically vary the laser irradiation conditions along with the position of the beam relative to the target.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the

Amendment Under 37 C.F.R. § 1.111
U.S. Appln No. 10/813,269

A8700

Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

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Date: June 6, 2007